DOCUMENT RESUME

ED 232 851 SE 042 623

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TITLE	Science Meta-Analysis Project: User's Guide for the Machine-Readable Raw Data File.
INSTITUTION	Colorado Univ., Boulder. Lab. for Research in Science and Mathematics Education.
SPONS AGENCY	National Science Foundation, Washington, D.C.
REPORT NO	NSF/SED-82028
PUB DATE	Jun 82
GRANT	SED-80-12310
NOTE	143p.; For related documents, see ED 223 475-476.
PUB TYPE	Guides - General (050) -- Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Academic Achievement; *Computer Storage Devices; *Databases; Elementary School Science; Elementary Secondary Education; *Information Retrieval; Magnetic Tapes; *Meta Analysis; *Science Curriculum; Science Education; *Science Instruction; Science Programs; Secondary School Science; Student Characteristics; Teacher Characteristics; Teacher Education; Teaching Methods
IDENTIFIERS	National Science Foundation; *Science Education Research

ABSTRACT

The Science Meta-Analysis Project (SMAP) resulted in the meta-analysis of a sizable proportion of the research in pre-college science education. Seven broad questions were examined during the study. These include the effects of different curriculum programs, effects of different instructional systems used in science teaching, effects of various science teaching strategies on achievement, effects of inquiry teaching and advance organizers in science education, effects of pre/in-service teacher education programs and techniques, relationships between teacher characteristics and teacher behaviors and student outcomes, and relationships between student characteristics and student outcomes in science. The raw data obtained during the study are available on a data tape described in this document. The tape (written in 1600 CPI 9-track, line image form with 80 columns per line) consists of seven separate files, one for each of the broad questions examined: curriculum programs, instructional systems, teaching strategies, nature/structure of content, teacher education, teacher characteristics, and student characteristics. The contents of each file are outlined by card number, column number(s) and variable. Also included are separate bibliographies of the research studies used in each of the seven data files. (JN)

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SCIENCE META-ANALYSIS PROJECT:

USER'S GUIDE FOR THE MACHINE-READABLE RAW DATA FILE

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June, 1982

This material is based upon work supported by the National Science Foundation under Grant No. SED 80-12310. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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INTRODUCTION

The Science Meta-Analysis Project (SMAP) funded by the National Science Foundation in 1980 resulted in the meta-analysis of a sizable proportion of the research in pre-college science education. In its simplest form, a meta-analysis is the pooling of results from related studies by finding the average value for some standardized statistic computed for each of the studies. When studies compare treatment and control groups on some outcome variable the statistic of interest is an effect size (called a "delta") which is the difference between the group means on the outcome variable in standard deviation units. The statistic used in the meta-analysis of correlational studies is the correlation coefficient. A great deal of information about each study in addition to an effect size or a correlation is also recorded on "coding forms" so that the effects can be averaged separately for different breakdowns of studies. This enables one to determine if the average effect size associated with a particular type of treatment, for example, is the same at different grade levels or in different instructional settings or for different kinds of students. More sophisticated types of analyses could also be used in meta-analysis.

Seven separate meta-analyses were conducted in conjunction with SMAP. The seven broad questions and the research teams which addressed them were:

1. What are the effects of different curriculum programs in Science? James A. Shymansky, William C. Kyle, Jr., Jennifer M. Alport, University of Iowa.

2. What are the effects of different instructional systems used in science teaching? John B. Willett, June J. M. Yamashita, Stanford University.

3. What are the effects of various science teaching strategies on achievement? Kevin C. Wise, James R. Okey, University of Georgia.

4. What are the effects of inquiry teaching and advanced organizers in science education? Gerald W. Lott, Michigan State University.

5. What are the effects of different preservice and inservice teacher education programs and techniques? Gary L. Sweitzer, Ohio State University.

6. What are the relationships between teacher characteristics and teacher behaviors and student outcomes? Cynthia Ann Druva, University of Minnesota.

7. What are the relationships between student characteristics and student outcomes in science? Mark R. Malone, M. Lynette Fleming, University of Colorado.

A complete detailed report on each of the seven studies is presented in the overall project report. The raw data obtained from the actual coding forms for the studies is available on a data tape described in this document.

GENERAL DESCRIPTION OF DATA TAPE

The SMAP data tape consists of seven separate files, one for each of the SMAP questions. It is a compilation of the raw data from card decks submitted by each of the research teams. The tape is written in 1600 CPI 9-track, line image form with eighty columns per line. A subsequent section of this document includes modified coding forms giving the variables used, how they are coded, and the cards and columns to which they are assigned.

Raw data files have both advantages and disadvantages. Certainly they are easy to merge onto a tape. The organization of the SMAP tapes in particular is ideal for users more at ease with card files. In many ways, the involvement of secondary users in the processing of raw data is easier than their trying to understand all the data manipulations performed on already processed files. This does mean, however, that the secondary users will have to assign variable and value names, write input format statements, deal with missing values, etc. The SMAP files contain all the keypunching errors and "impossible values" with which the original researchers had to contend. Perhaps they will want to handle such problems differently. Thus, an important early step in the use of the SMAP data would be the examination of frequencies of values for each of the variables in a file. Then, some errors can be corrected by approrpiate recordings or computations. Also, frequencies will reveal those variables which are of little use. Quite often, the original researchers found very little information on variables they included on their coding forms. Study codes are printed in the biblopgraphy of each study. These codes will enable a user to match the data from a particular study to the biblographical reference.

Specific information pertaining to each of the seven files is presented in the next section.

CONTENTS OF DATA FILES

File #1 - Curricular Programs

N of Cases: 341 Cards/Case: 2

Other Information: Decimal points are included in raw data where appropriate.

BACKGROUND AND CODING INFORMATION

Card	Column	Variable
1	1	Card Number (always "1")
	2-3	Reader Code (1st digit is site (always "1"); 2nd digit is coder)
	4-7	Study Code
	8-11	Comparison Code (e.g., "0102" indicates 1st of 2 comparisons important if same study yields more than one treatment - control comparison for same outcome variable)
	12-15	Outcome Code (e.g. "0102" indicates 1st of 2 outcome variables used from study)
	16-17	Date of Publication (last two digits of year)
	18	Form of Publication (1) Journal (2) Book (3) MA/MS Thesis (4) Dissertation (5) Unpublished
	19-20	Blank
		SAMPLE CHARACTERISTICS
	21	Grade Level (1) Primary: K-3 (2) Intermediate: 4-6 (3) Jr. High: 7-9 (4) Sr.High: 10-12 (5) Post Secondary
	22-25	Total Sample Size
	26-27	Length of Study (in weeks)
	28-29	Gender (% Female)
	30	Average Ability (1) Low (below 95 IQ) (2) Average (95-105) (3) High (above 105)
	31	Homogenity of IQ (1) Homogeneous (2) Heterogenous
	32	Source of IQ (1) Stated (2) Inferred
	33-34	Race (% non-white)
	35	Predominant Minority (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American (5) Black (6) Other
	36-37	% Predominant Minority
	38	SES (1) Low (2) Medium (3) High
	39	Homogeneity of SES (1) Homogeneous (2) Heterogeneous
		Secondary School Science Background
	40	Life Science (1) Yes (2) No
	41	Physical Science (1) Yes (2) No
	42	General Science (1) Yes (2) No
	43	Earth Science (1) Yes (2) No
	44	Biology (1) Yes (2) No
	45	Chemistry (1) Yes (2) No
	46	Physics (1) Yes (2) No

47 Handicapped (1) Visually impaired (2) Hearing impaired (3) Learning disability (4) Emotionally disturbed (5) Multiple handicaps

48-51 N of pupils in T_1 (Experimental)

52-55 N of pupils in T_2 (Control)

56-57 % Mortality T_1

58-59 % Mortality T_2

60 Special Grouping by Ability (1) Not grouped (2) Low track (3) Medium track (4) High track

61 Size of School (1) < 50 (2) 50-199 (3) 200-499 (4) 500-999 (5) 1000-1999 (6) > 2000

62 Type of Cummunity (1) Rural (2) Suburban (3) Urban

TREATMENT CHARACTERISTICS

63-64 Treatment Code:

Elementary Curricula
- 01 ESS
- 02 SCIS, SCIIS, SCIS II
- 03 S-APA
- 04 OBIS
- 05 ESLI
- 06 ESSENCE
- 07 COPES
- 08 MAPS
- 09 USMES
- 10 MINNEMAST
- 11 IS
- 12 SCII
- 13 Elementary School Training Program in Scientific Inquiry
- 14 Flint Hills Elementary Science Project

Junior High Curricula
- 30 ISIS
- 31 ISCS
- 33 IPS
- 34 ESCP
- 35 IME
- 36 Conservation Education/Environmental Education/Ecology
- 37 Montclair Science Project

Secondary Curricula
- 50 BSCS Special Materials
- 51 BSCS Yellow
- 52 BSCS Blue
- 53 BSCS Green
- 54 BSCS Advanced
- 55 CHEM Study
- 56 CBA
- 57 PSSC
- 58 Project Physics
- 59 Conservation Education/Environmental Education/Ecology
- 60 PSMS
- 61 IAC

	Curriculum Profile (Low 1 2 3 High 4)
65	Inquiry
66	Process Skills
67	Emphasis on Laboratory
68	Degree of Individualization
69	Emphasis on Content
	Study Modification to Curriculum Profile (1) Modifications made toward "low" end of curriculum profile (2) No modifications made (3) Modifications made toward "high" end of curriculum profile
70	Inquiry
71	Process Skills
72	Emphasis on Laboratory
73	Degree of Individualization
74	Emphasis on Content
	Technology Used
75	Hand Held calculators (1) Yes (2) No
76	Films (1) Yes (2) No
77	TV (1) Yes (2) No
78	Computer (1) Yes (2) No
79	Blank
80	Blank

CODING INFORMATION

Card	Column	Variable
2	1	Card Number (always "2")
	2-3	Reader Code (1st digit is site (always "1"); 2nd digit is coder)
	4-7	Study Code
	8-11	Comparison Code (e.g., "0102" indicates 1st of 2 comparisons important if same study yields more than one treatment-control comparison for same outcome variable)
	12-15	Outcome Code (e.g. "0102" indicates 1st of 2 outcome variables used from study)
		TEACHER CHARACTERISTICS
	16-17	% Female
	18-19	Average number of years of science teaching experience
	20-21	Average number of years teaching science curriculum T_1
	22-23	Average number of years teaching science curriculum T_2
	24-25	Race (% non-white)
	26	Predominant minority (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
	27-28	%Predominant Minority
	29	Educational Background (1) Less than Bachelors (2) Bachelors (3) Bachelors + 15 (4) Masters (5) Masters + 15 (6) Masters + 30 (7) Doctorate
	30	Was preservice training provided? (1) Yes (2) No
	31	Was inservice training provided? (1) Yes (2) No
	32	Was inservice training (1) locally funded and/or sponsored (2) university funded and/or sponsored (3) federally funded (4) information not provided

DESIGN CHARACTERISTICS

33 Assignment of S_s to treatment (1) Random (2) Matched (3) Intact (4) Self-selecting

34 Assignment of teachers to treatments (1) Random (2) Non-random (3) Self-selecting (4) Crossed (5) Matched

35 Unit of Analysis (1) Infividual (2) Classroom (3) School (4) Other group

36 Type of Study (1) Correlational (2) Quasi-Experimental (3) Experimental (4) Pre-Experimental

37 Rated internal validity (1) Low (intact; highly dissimilar) (2) Medium (random; or, intact with some threats) (3) High (random; low mortality)

OUTCOME CHARACTERISTICS

(Each Outcome Geta a Separate Coding Form)

38 Content of Measure (1) Life Science (2) Physical Science (3) General Science (4) Earth Science (5) Biology (6) Chemistry (7) Physics

39 Congruence of Measure with T_1 (1) Low (2) Medium (3) High

40 Congruence of Measure with T_2 (1) Low (2) Medium (3) High

41-42 Type of Criterion:

01 Cognitive -low
02 Cognitive -high
03 Cognitive -mixed/general achievement
04 Problem Solving
05 Affective -subject
06 Affective -science
07 Affective -procedure/methodology
08 Values
09 Process skills
10 Methods of science
11 Psychomotor
12 Critical thinking
13 Creativity
14 Decision making
15 Logical thinking (Piagetian)
16 Spatial relations (Piagetian)
17 Self-concept
18 Classroom behaviors (on task, etc.)
19 Reading
20 Mathematics
21 Social Studies
22 Communication skills

43 Criterion measured relates to (1) student performance (2) teacher performance

44 Method of measurement: (1) Standardized test (2) Ad hoc written test (researcher, project) (3) Classroom test (not including #1 or #2) (4) Observation (passive, instructional) (5) structural interview or assessment

45 Reactivity (1) Low (standardized test, etc.) (2) Medium (3) High (researcher has vested interest, i.e., attitude measure, etc.)

EFFECT SIZE CALCULATION

46-47 Source of Effect Size Data:
  01 Directly from reported data or raw data (means and variances)
  02 Reported with direct estimates (ANOVA, t, F)
  03 Directly from frequencies reported on ordinary scale (Probit, X^2)
  04 Backwards from variance of means with randomly assigned groups
  05 Nonparametrics (other than #3)
  06 Guessed from independent sources (test numbers, other students using same test, conventional wisdom)
  07 Estimated from variance of gain scores (correlation guessing)
  08 From probability level only (i.e. conservative estimate)

48 Source of Means: (1) unadjusted posttest (2) covariance adjusted (3) residual gains (4) pre,post-differences (5) Other

49 Reported Significance:
  1 $p \leq .005$
  2 $.005 < p \leq .01$
  3 $.01 < p \leq .05$
  4 $.05 < p \leq .10$
  5 $p > .10$

50 Dependent Variable Units (1) grade-equivalent units (2) Other
51-53 Mean Difference in Grade Equivalent Units (decimal in column 52)
54 Have the group variances been observed individually?
(1) Yes (2) No (if no, go to 76)
55-60* Ratio of experimental to control group variances
61-65* Effect size based on experimental group variance (A)
66-70* Effect size based on control group variance (B)
71-75* Average effect size based on (A) and (B)

*Decimal points are included in raw data. There are two places to the right of the decimal point for these five variables.

File #2 - Instructional Systems

N of Cases: 346 Cards/Case: 10

Other Information: Decimal points omitted -proper placement indicated where appropriate. See starred (*) variables from card #10

Card	Column	Variable
1	3-6	Study identification code
	7-8	Comparison code (numbered sequentially, important if same study compared more than one treatment group to control)
	9-10	Outcome code (numbered sequentially, important if same study used more than one outcome variable)
	11-14	Year in which study was reported
	15	Form in which study was reported (1) Journal article (2) Book (3) Master's thesis (4) Doctoral thesis (5) Unpublished article (6) Conference paper
2	1-2	Mean age of students in treatment group
	3-4	Modal grade of treatment group
	5-7	Average IQ of treatment group
	8	Source of treatment group IQ (1) Stated (2) Inferred
	9	Homogeneity of treatment group IQ (1) Homogeneous (2) Heterogeneous
	10-12	Percent female in treatment group
	13-15	Percent minority in treatment group
	16	Predominant minority in treatment group (1) Mexican (2) Other Hispanic (3) Asian (4) Native American (5) Black (6) Other
	17-19	Percent predominant minority in treatment group
	20	Mean socioeconomic status of treatment group (1) Low (2) Medium (3) High
	21	Homogeneity of treatment group SES (1) Homogeneous (2)Heterogeneous
	22	Treatment group handicap, if any (1) Vision impaired (2) Hearing impaired (3) Learning disabled (4) Emotionally disturbed (5) Multiple handicaps (6) Other
	23	Treatment group tracking (1) Not grouped (2) Low track (3) Medium track (4) High track
	24-26	Initial size of treatment group
	27-29	Final size of treatment group
	30	School size of treatment group (1) Less than 50 (2) 50 to 199 (3) 200 to 499 (4) 500 to 999 (5) 1000 to 2000 (6) More than 2000
	31	Community type of treatment group (1) Urban (2) Rural (3) Suburban
3		ON CARD 3 COLUMNS 1-31 CONTAIN THE SAME INFORMATION ON THE CONTROL GROUP THAT CARD 2 DOES ON THE TREATMENT GROUP. ON CARD 3, THE VARIABLE NAMES END WITH 2 INSTEAD OF 1 (e.g., COMM2).

Card	Column	Variable
4	1-2	Number of teachers in treatment group
	3-4	Mean teacher age in treatment group
	5-6	Treatment group teachers, average number of years of teaching
	7-8	Average number of years of science teaching
	9-10	Average number of years teaching this curriculum
	11-13	Percent female teachers in treatment group
	14-16	Percent minority teachers in treatment group
	17	Predominant minority of treatment group teachers (1) Mexican (2) Other Hispanic (3) Asian (4) Native American (5) Black (6) Other
	18-20	Percent predominant minority teachers in treatment group
	21	Educational background of treatment group teachers (1) Less than B.A. (2) B.A. only (3) B.A. + 15 units (4) M.A. only (5) M.A. + 15 unity (6) M.A. + 30 units (7) Doctorate
	22	Treatment group teacher inservice training prior to experiment (1) Low: one-shot (2) Medium: series of lectures or workshops (3) Specialization
	23	Training through NSF? (1) Yes (2) No
	24	Training obtained at university? (1) Yes (2) No
	25	Training obtained locally? (1) Yes (2) No
	26	Treatment group teachers' acceptance of philosophy (1) Low (2) Medium (3) High
	27	Assignment of students to treatment group (1) Stratified random (2) Random (3) Matched (4) Intact random (5) Intact nonrandom (6) Self-selected
	28	Assignment of teachers to treatment group (1) Random (2) Nonrandom (3) Self-selected (4) Crossed (5) Matched
	29	Treatment group rated internal validity (1) Low (intact, highly dissimilar) (2) Medium (random or intact, some threat) (3) High (random, low mortality)
	30	Treatment group unit of analysis (1) Individual (2) Classroom subgroup (3) Classroom (4) School (5) Other
	31	Type of study (1) Correlational (2) Quasi-Experimental (3) Experimental
5		ON CARD 5, COLUMNS 1-31 CONTAIN THE SAME INFORMATION ON THE CONTROL GROUP THAT CARD 4 DOES ON THE TREATMENT GROUP. ON CARD 5, THE VARIABLE NAMES END WITH 2 INSTEAD OF 1.
6	1	Subject matter in treatment group (1) General science (2) Life Science (3) Physical Science (4) Biology (5) Earth Science (6) Chemistry (7) Physics (8) Other
	2-3	Duration of treatment group program in weeks
	4-5	Time elapsed prior to testing, in weeks
	6-8	Minutes per week of treatment
	9-10	Frequency of testing, times permonth
	11	Treatment group fidelity to curriculum (1) Low (2) Medium (3) High
	12	Fidelity to treatment (1) Low (2) Medium (3) High
	13	Nature of implementation (1) Supplemental (2) Integral

	14	Behavioral objectives in treatment group (1) Used (2) Not used
	15	Self-paced in treatment group (1) Used (2) Not used
	16	Immediate feedback in treatment group (1) Used (2) Not used
	17	Diagnostic Testing and prescription in treatment group (1) Used (2) Not used
	18	Computer assisted instruction in treatment group (1) Used (2) Not used
	19	Computer managed instruction in treatment group (1) Used (2) Not used
	20	Computer simulated experiments in treatment group (1) Used (2) Not used
	21	Team teaching in treatment group (1) Used (2) Not used
	22	Teacher as tutor in treatment group (1) Used (2) Not used
	23	Pupil as tutor in treatment group (1) Used (2) Not used
	24	Individualized instruction in treatment group (1) Used (2) Not used
	25	Unit approach to instruction in treatment group (1) Used (2) Not used
	26	Departmentalized elementary school in treatment group (1) Used (2) Not used
	27	Source papers in treatment group (1) Used (2) Not used
	28	Traditional science classroom in treatment group (1) Used (2) Not used
7		ON CARD 7, COLUMNS 1-28 CONTAIN THE SAME INFORMATION ON THE CONTROL GROUP THAT CARD 6 DOES ON THE TREATMENT GROUP.
8	1-2	Average class size in treatment group
	3	Flexible modular scheduling in treatment group (1) Used (2) Not used
	4	Large group organization (1) Used (2) Not used
	5	Normal class grouping in treatment group (1) Used (2) Not used
	6	Small group organization (1) Used (2) Not used
	7	Group of 1 student (1) Used (2) Not used
	8	Laboratory activities in treatment group (1) Used (2) Not used
	9	Teacher demonstrations in treatment group (1) Used (2) Not used
	10	Student lab activities structured in treatment group (1) Used (2) Not used
	11	Student lab activities unstructured in treatment group (1) Used (2) Not used

12 Nature of treatment group learning materials (1) Published (2) Modified published (3) Original

13 Learning kits in treatment group (1) Used (2) Not used

14 Linear programmed materials (1) Used (2) Not used

15 Branched programmed materials (1) Used (2) Not used

16 Programmed materials graded by reading level in treatment group (1) Used (2) Not used

17 Self-directed study (1) Used (2) Not used

18 Student-assisted instructional program (1) Used (2) Not used

19 Media-based instruction (1) Television (2) Not used (3) Film (4) Teaching machines (5) Slides (6) Tapes

20 Victor electrowriter (1) Used (2) Not used

21 Mastery learning (1) Required (2) Not required

22-24 Level of mastery required

25 Teacher-directed remediation (1) Used (2) Not used

26 Student-directed remediation (1) Used (2) Not used

27 Keller Personalized System of Instruction (1) Used (2) Not used

28 Audio-Tutorial (1) Used (2) Not used

29 Contracts for learning (1) Used (2) Not used

9 ON CARD 9, COLUMNS 1-29 PROVIDE THE SAME INFORMATION ON THE CONTROL GROUP THAT CARD 8 DOES ON THE TREATMENT GROUP.

10 1-2 Type of outcome criterion:
01 Cognitive low (recall, comprehansion)
02 Cognitive hish (application)
03 Cognitive mixed/general achievement
04 Problem solving
05 Affective toward subject
06 Affective toward science
07 Affective toward procedure/method
08 Values
09 Process skills
10 Methods of science
11 Psychomotor (lab skills)
12 Critical thinking
13 Creativity
14 Decision making

15 Logical thinking
16 Spatial reasoning
17 Self-concept
18 Science perceptions

3 Congruence of measure with treatment program (1) Low (2) Medium (3) High

4 Congruence of measure with control program (1) Low (2) Medium (3) High

5 Method of measurement (type of instrument) (1) published, nationally available, standardized (2) Modification of national standardized (3) Ad hoc written tests (4) Classroom evaluation, excluding #1-3 (5) Observation (passive, unstructured) (6) Structured interview, assessment (7) Other

6 Reactivity of measure: (1) Low: cognitive meansure, one administration or long lag, not alterable (2) Medium (3) High: affective, transparent, alterable

7-8 Calculation of effect size:
  01 Directly from reported or raw data
  02 Reported with direct estimates (ANOVA, etc.)
  03 From frequencies reported on ordinal scales
  04 Backwards from other variances of means
  05 Nonparametrics (other than #3)
  06 Estimated from independent sources
  07 Estimated from variance (correlation guessing)
  08 Estimated from p-value
  09 From raw data with teacher (year) effects removed
  10 Other
  11 From percentiles

9 Source of means:
  1 Unadjusted posttest
  2 Covariance adjusted
  3 Residual gains
  4 Pre-post differences
  5 Other

10 Reported significance
  1 $p \leq .005$
  2 $.005 < p \leq .01$
  3 $.01 < p \leq .05$
  4 $.05 < p \leq .10$
  5 $p > .10$
  6 "not significant"
11 Dependent variable units (1) Grade-equivalent (2) Other

12-15 Mean difference in grade equivalent units

16 Group variances reported individually (1) Yes (2) No

17-20 Ratio of treatment to control group standard deviation

21-24	Effect size based on treatment group standard deviation
25-28	Effect size based on control group standard deviation
29-32	Average of ESE and ESC
33-36	Study Effect Size (same as effect size based on control group standard deviation when available; otherwise could be based on "pooled" standard deviation derived from t-scores, mean squares from ANOVA, etc.)

*No decimal points were printed on the raw data cards. The last two columns for each of these variables represent digits to the right of the decimal point. Users should take this into account by using the appropriate input format statements in their own computer routines. For negative values of these variables, the negative signs are printed on the raw data cards in the first of the four columns designated for those variables.

File #3 - Teaching Strategies

N of Cases: 411 Cards/Case: 2

Other Information: Decimals are not included in the raw data. Users must allow for them in their own input formats where appropriate.

REPORT ID

Card	Column	Variable
1	1-2	Reader (31, 32, or 33)
	3-6	Study Code (numbered consecutively from 3001)
	7	Record ID (1 or 2 indicating 1st or 2nd card of case)

STUDY DATA

Card	Column	Variable
	8-11	Comparison code (e.g., 0103 indicates 1st comparison of 3 obtained from study. If a study used 2 treatment and 1 control group, comparison would be possible.)
	12-15	Outcome code (e.g., 0102 indicates 1st dependent variable of 2 used from study)
	16-17	Year of study (69, 73, etc.)
	18	Form of study (1) Journal (2) Book (3) Master's Thesis (4) Dissertations (5) Unpublished

STUDENT DATA

Card	Column	Variable
	19-20	Mean age to nearest year
	21-22	Grade level (00-kindergarten, 16-senior in college)
	23-25	Average IQ
	26	Homogeneity of IQ (1) Homogeoeous (2) Heterogeneous
	27	Source of IQ (1) Stated (2) Inferred
	28-29	Gender (% female) (00 to 99)
	30	High school science background: (current enrollment) 1 General science 2 Life science 3 Physical science 4 Biology 5 Earth science 6 Chemistry 7 Physics
	31-32	Race (%non-white)

33	Predominant minority race (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
34-35	% predominant minority
36	SES status (1) Low (2) Middle (3) High
37	Homogeneity of SES (1) Homogeneous (2) Heterogenous
38-40	Experience in program or method (days)
41	Handicapped (1) Visually impaired (2) Hearing impaired (3) Learning Disability (4) Emotionally disturbed (5) Multiple handicaps (6) Not handicapped
42	Special Grouping (1) Not grouped (2) Low track (3) Medium track (4) High track (5) Voluntary
43-45	Number of subjects
46-47	% Mortality

TEACHER DATA

48-49	Age
50-51	Experience teaching (# of years)
52-53	Experience teaching subject
54-55	Experience teaching curriculum
56-57	Race (% non-white)
58	Predominant minority race (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
59-60	% predominant minority
61-62	Gender (% female)
63-64	NSF training (%teachers with training)
65	Educational background (1) less than Bachelors (2) Bachelors (3) Bachelors + 15 or more (4) Masters (5) Masters + 15 or more (6) Masters + 30 or more (7) Doctorate
66-67	Number of teachers
68-69	Special training given (% teachers with training specialized for program or method)
70-71	Acceptance of philosophy (01) Low (02) Medium (03) High

CONTEXT CHARACTERISTICS

Card	Column	Variable
2	8	Size of school (1) < 50 (2) 50-199 (3) 200-499 (4) 500-999 (5) 1,000-2,000 (6) > 2,000
	9	Community type (1) urban (2) rural/town (3) suburban
	10-11	Class size (average # of students)
		DESIGN CHARACTERISTICS
	12	Treatment fidelity measured (1) yes (2) no
	13	Assignment of Ss (1) random (2) matched (3) intact (4) voluntary
	14	Assignment of teachers (1) random (2) non-random (3) voluntary (4) crossed (5) matched
	15	Internal validity (1) low (2) medium (3) high
	16	Unit of analysis (1) individual (2) classroom (3) school (4) other
	17	Type of study (1) correlational (2) quasi-experimental (3) experimental
		TREATMENT
	18-19	Strategy (1) questioning (2) wait-time (3) testing (4) on task (5) manipulative (6) presentation modes (7) inquiry (8) AV (9) teacher direction (10) other
	20-21	Duration (# of hours)
	22	Teacher role (1) presenter (2) manager (3) 1 plus 2 (4) consultant (5) passive (6) unknown
	23	Student role (1) receiver (2) direction follower (3) problem solver/analyzer/synthesizer (4) evaluator (5) other
	24	Task specificity (1) low (2) medium (3) high (4) unknown
	25-26	Focus of strategy (01) lab (02) non-lab (03) entire (04) out of class
	27	Questioning type (1) (2) (3) (4)
	28-29	Question level (% high)
	30	Wait time (1) after question (2) after response (3) both
	31	Wait time (SECS)

32 Testing frequency (# per week)

33 Testing type (1) test only (2) test + feedback (3) test + feedback + remedial (4) to mastery (5) pretest

34 Testing responsibility (1) student (2) teacher (3) joint

35

36 On task technique (1) reinforcers (2) penalties (3) testing (4) clear purpose (5) verbal (6) other

37 Area (1) biology (2) chemistry (3) earth science (4) physical science (5) general science (6) other

OUTCOME CHARACTERISTICS

41-42 Type of criterion (1) cognitive low k-c (2) cognitive high AP (3) cognitive mixed/gen. ach. (4) problem solving (5) affective-subject (6) affective-procedure (7) affective-science (8) values (9) process skills (10) methods of science (11) psychomotor (12) critical thinking (13) creativity (14) decision making (15) logical thinking-Piaget (16) spatial reasoning (17) other

43 Method of measurement (1) published (2) ad hoc (3) classroom test (4) observation (5) structured interview (6) other

44-45 Criterion reliability (.00-.99 decimal not included)

46 Reactivity of criterion (1) low (2) medium (3) high

EFFECT SIZE CALCULATION

47-48 Source of effect size data (1) Directly from reported data or raw data (means & variances) (2) Reported with direct estimates (ANOVA, t, G) (3) Directly from frequencies reported on ordinal scale (Probit, X^2) (4) Backwards from variance of means with randomly assigned groups (5) Nonparametrics (other than #3) (6) Guessed from independent sources (test manuals, other students using same test, conventional wisdom) (7) Estimated from variance of gain scores (correlation guessing) (8) (9) (10) Other

49 Reported significance (1) $p \leq .005$ (2) $.005 < p \leq .01$ (3) $.01 < p \leq .05$ (4) $.05 < p \leq .10$ (5) $p > .10$

50 Dependent variable units (1) grade-equivalent units (2) other

51-53

54	Have the group variances been observed individually? (1) Yes (2) No (if no, go to 8.0)
55-66	
67-70	Study effect size (sign in column 67, no decimal in raw data - users must allow for two digits to the right of decimal in their own input format statements)

File #4 - Nature and Structure of Content

N of Cases: 583　　　　Cards/case: 6

Other Information: Missing values are coded as ¯1 in raw data. Decimals not included. Users must allow for them in their own input formats where appropriate.

Card	Column	Variable	
1	1-2	ID01	Reader code
	3-6	ID02	Study code
	7-10	ID03	Comparison code
	11-14	ID04	Outcome code
	15-16	ID05	Year of study
	17-18	ID06	Form of study: (1) Journal (2) Book (3) Masters Thesis (4) Dissertations (5) Unpublished manuscript
			STUDENT CHARACTERISTICS
	19-20	SC01	Modal grade
	21-23	SC02	Ability level (IQ)
	24-25	SC03	Homogenity of IQ: (1) Homogeneous (2) Heterogeneous
	26-27	SC04	Source of IQ: (1) Stated (2) Inferred (3) Calculated
	28-30	SC05	Gender (% female)
	31-32	SC06	Highest level secondary school science: (1) general science (2) life science (3) physical science (4) biology (5) earth science (6) chemistry (7) physics
	33-35	SC07	Race (% non-white)
	36-37	SC08	Predominant race: (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
	38-40	SC09	% Predominant race
	41-42	SC10	SES: (1) Low (2) Low & Medium (3) Medium (4) Medium & High (5) High
	43-44	SC11	Homogeneity of SES: (1) Homogeneous (2) Heterogeneous
	45-46	SC12	Previous experience in program or method (wks.)
	47-48	SC13	Handicapped: (1) visually impaired (2) hearing impaired (3) learning disability (4) emotionally disturbed (5) multiple handicaps
	49-50	SC14	Special grouping: (1) not grouped (2) low track (3) medium track (4) high track (5) voluntary
	51-54	SC15	Class size (no. of students): experimental
	55-58	SC16	Class size (no. of students): control
	59-61	SC17	% mortality: experimental
	62-64	SC18	% mortality: control
	65-66	SC19	Experience or background congruence: (1) good (5) poor

	67-68	SC20	Content organizing ability: (1) good (5) poor
	69-70	SC21	Piagetian level: (1) preoperational (2) concrete (3) formal

Card	Column		Variable
2	1-2	SC22	Seriation ability: (1) Stage I (2) Stage II (3) Stage III

TEACHER CHARACTERISTICS

	3-4	TC01	Age
	5-6	TC02	Experience teaching (avg. no. of yrs.)
	7-8	TC03	Science background (avg. no. of college courses)
	9-11	TC04	Race (% non-white)
	12-13	TC05	Predominant minority: (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
	14-16	TC06	%Predominant minority
	17-19	TC07	Gender (% female)
	20-21	TC08	In-service training in strategy or curriculum: (1) None (2) Some (3) A lot
	22-23	TC09	Federally sponsored (1) Yes (2) No
	24-25	TC10	University sponsored: (1) Yes (2) No
	26-27	TC11	Locally sponsored: (1) Yes (2) No
	28-29	TC12	Pre-service training in strategy or curriculum: (1) None (2) Some (3) A lot
	30-32	TC13	Experience with specific curriculum (wks.)
	33-34	TC14	Educational background: (1) < Bachelors (2) Bachelors (3) Bachelors + 15 (4) Masters (5) Masters + 15 (7) Doctorate
	35-37	TC15	Special training given (% teachers with training specialized for program method)
	38-39	TC16	Acceptance of philosophy: (1) low (2) medium (3) high

CONTEXT CHARACTERISTICS

	40-41	CC01	Size of school: (1) < 50 (2) 50-199 (3) 200-499 (4) 500-999 (5) 1,000-2,000 (6) > 2,000
	42-43	CC02	Community type: (1) Urban (2) Rural (3) Suburban (4) Mixed
	44-45	CC03	Foreign Milieu: (1) Middle East (2) Canada (3) Isreal (4) U.S. Dep. Schools - Europe

DESIGN CHARACTERISTICS

	46-47	DC01	Assignment of Ss to Treatments: (1) Random (2) Matched (3) Intact Groups (4) Self-select
	48-49	DC02	Assignment of Teachers to Treatments: (1) Random (2) Non-Random (3) Self-Select (4) Crossed (5) Matched (6) Investigator
	50-51	DC03	Rated Internal Validity (see conventions): (1) Low (2) Medium (3) High
	52-53	DC04	Unit of Analysis: (1) Individual (2) Classroom (3) Grade Level (4) School (5) District
	54-55	DC05	Type of Study: (1) Correlational (2) Quasi-Experimental (Descriptive) (3) Experimental (4) Pre-Experimental (One group pre/post)
	56-57	DC06	Experimental Design: (1) Blocking (10) Factorial (30) Covariance (31) Covariance Blocking (32) Covariance Factorial (33) Covariance Blocking & Factorial

TREATMENT

Duration:

58-59 TD01 Number of weeks
60-62 TD02 Number of sessions
63-65 TD03 Minutes per session

Card	Column	Variable
		Experimental Group
		Characteristics:
		Pre - instructional Strategies:
3	1-2	EX01 Advance Organizers: (1) Used (2) Integrative (3) Expository (4) Subsumption (5) Correlative (6) Comparative (7) Expository (Abstract) (8) Expository (Concrete)
	3-6	EX02 Length (1) ____ Words (2) ____ Minutes
	7-8	EX03 Style: (1) Written (2) Written & Lab (3) Verbal (4) Discussion
	9-10	EX04 Behavioral Objectives: (1) Used
	11-12	EX05 Set Induction: (1) Used
		Inquiry Orientation:
	13-14	EX06 Inductive vs. Deductive: (1) Inductive (Discovery) (2) Deductive (Expository)
	15-16	EX07 Guidance: (1) Structured (2) Free exploration (3) Guided exploration
		Manipulative Level:
	17-18	EX08 Level of Access: (1) Remote demonstration (2) Individual manipulation
	19-20	EX09 Extent of Access: (1) Periodic (2) Frequent
	21-22	EX10 Type of Use: (1) Picture study (2) Object manipulation (3) Both
	23-24	EX11 Levels of Inquiry (see Shulman & Tamir, 1973): (1) None (2) Low (3) Medium (4) High
		Characteristics of Learning Tasks:
	25-26	EX12 Kinetic Structure (see Anderson, 1969): (1) Low structure (2) High structure (3) Intermediate structure
	27-31	EX13 Commonality Coefficient (B_1) (3 digits to right of decimal)
	32-33	EX14 Mathemagenic Behaviors (see Rothkopf, 1970): (1) Used (2) Translation (3) Segmentation (4) Processing
	34-35	EX15 Types of Learning (see Gagne, 1970): (1) Signal (2) Stimulus-Response (3) Chaining (4) Verbal association (5) Multiple discrimination (6) Concept learning (7) Rule learning (8) Problem solving
	36-37	EX16 Levels of Activities (see Bloom, 1956): (1) Knowledge (2) Concept (3) Application (4) Analysis (5) Synthesis (6) Evaluation (7) Application - Evaluation
	38-39	EX17 Conditions of Learning (see Gagne, 1977): (1) Motor skills (2) Attitude (3) Verbal information (4) Intellectual skills (5) Cognitive strategies (6) Intellectual skills & Cognitive strategies
	40-41	EX18 Kinds of Activities (1) Recall (2) Distinctions (3) Develop (4) Assess

42-43	EX19	Learning Structure Condition: (1) Compatible (2) Incompatible
		Scientific Thinking and Reasoning Strategy Orientation:
44-45	EX20	Cognitive level of emphasis (see Piaget, 1936): (1) Sensory Motor (2) Pre-operational (3) Concrete operational (4) Formal operational
46-47	EX21	Reasoning strategies: (1) Hypothetico-Deductive (2) Theoretical (3) Combinatorial (4) Probabilistic (5) Proportional (6) Proportional & Combinatorial
48-49	EX22	Cognitive level of emphasis (see Klausmeier, 1979): (1) Concrete level(2)Identity level (3) Classificatory level (4) Formal level
50-51	EX23	Process-orientation: (1) Observation (10) Investigating and Manipulating:(11)Controlling variables (12) Predicting (13) Formulating hypotheses (14) Deisgning experiments (15) Experimenting (20) Organizing and Quantifying: (21) Measuring (22) Classifying (23) Using numbers (24) Collecting and organizing data (30) Generalizing: (31) Inferring (32) Interpreting data (33) Explanation (34) Formulating models
		Structure of Content: (see Haggis and Adey, 1979):
52-53	EX24	Organization of content: (1) Topic (2) Process (3) Concept (4) Environment (5) Historical (6) Psychological (7) Random
54-55	EX25	Scope of Content: (1) Disciplinary (2) Integrated (3) Multi-Disciplinary (4) Interdisciplinary
56-57	EX26	Disciplines: L) Chemistry and Physics (2) Biology, Chemistry, and Physics (3) Science and Industrial Arts (4) Physical Geology and Archeology (5) Biology and Art (6) Science and Math
58-59	EX27	Intensity of Integration: (1) Coordinated (2) Combined (3) Amalgamated
		Question Characteristics:
60-61	EX28	Level (see Bloom, 1956): (1) Knowledge (2) Concept (3) Application (4) Analysis (5) Synthesis (6) Evaluation (7) Application-Evaluation
62-63	EX29	Type: (1) Adjunct (2) Relevant (3) Incidental
64-65	EX30	Degree of Generality: (1) Items (2) Catagories (3) Systematic Patterns
		Instructional Sequencing:
66-67	EX31	Type: (1) Progressive differentiation (2) Developmental level of cognitive functioning (3) Hierarchical (4) Random (5) Learning cycle (i.e. SCIS)
68-69	EX32	Sequencing Unit: (1) Single lesson (2) Instructional unit (3) Instructional Term (4) Instructional Program

Card	Column	Variable
		Characteristics of Content:
4	1-2	EX33 Content-orientation (see Klopfer, 1971): (1) General science (10) Biological science: (11) Microbiology (12) Genetics (13) Evolution (14) Botany (15) Zoology (16) Physiology (17) Ecological (24) Biological Names

(25) Chemistry:(26) Atomic and Molecular Structure (27) Chemical Bonding (28) Mole Concept (29)Chemical reactions (30) Kinetic Theory (31) Energy Relationships and Equilibrium in Chemical Systems (32) Electrochemistry (33) Organic Chemistry (34) Chemistry of Life Processes (35) Nuclear Chemistry

(40)Physics: (41) Electricity and Magnetism (42) Heat (43) Energy (44) Light (45) Properties and Structure of Matter (46) Sound and Wave Phenomena (47) Mechanic and Motion (48) Heat and Optics

(55) Earth Science (56) Astronomy (57) Physical Geology (58) Oceanography (59) Meteorology (60) Historical Geology

(65) Biochemistry

3-4	EX34	Concept orientation (see Fuse, 1975): (1) Cause-effect (2) Change (3) Cycle (4) Energy (5) Matter (6) Interaction (7) Model (8) Organism (9) Population (1) System (11) Theory
5-6	EX35	Affective orientation: (1) Used
7-8	EX36	(see Bloom, 1964): (1) Attending (2) Responding (3) Valuing (4) Organization (5) Value complex
9-10	EX37	Values orientation (see Fuse, 1975): (1) Longing to know (2) Questioning (3) Search for data (4) Demand for verification (5) Logic (6) Consideration of premises (7) Consideration of Solutions
11-12	EX38	Issues and/or Application orientation: (1) Used
	Representation of Content:	
13-14	EX39	Relationships: (1) Used (2) Concept Maps (3) Flow Diagrams: Picture Word (4) Flow Diagram: Block Word
15-16	EX40	Pictorial: (1) Photograph (2) Perspective Diagram (3) Outline Drawing
17-18	EX41	Exemplification: (1) Analogy (2) Metaphor
	Prior Knowledge Assessment:	
19-20	EX42	(1) Used (2) Prerequisite concepts (3) Prerequisite concepts: Mathematics
21-22	EX43	Purpose: (1) Covariance (2) Instructional (3) Independent Variable
	Postinstructional Strategies:	
23-24	EX44	Post Organizer: (1) Used
	Features:	
25-26	EX45	Teacher interaction: (1) Direct (2) Indirect
	Instructional Technique:	
27-28	EX46	Management: (1) Diagnostic testing and prescription (2) Mastery learning approach (3) Competency-based
29-30	EX47	Organization: (1) Individualized instruction (2) Computer managed or assisted instruction (3) Audio-tutorial (4)Programmed

Mode of Communicating Knowledge:
31-32 EX48 (1) Audio-visual (2) Audio (3) Written
33-34 EX49 (1) Lecture (2) Discussion (3) Both
35-36 EX50 (1) Demonstration (2) Laboratory (3) Field Trip (4) Demonstration and Laboratory (5) Laboratory and Field Trip

Evaluation Techniques:
37-38 EX51 Testing Format: (1) Objective (2) Subjective (3) Both
39-40 EX52 Grading: (1) Pass/Fail (2) Letter grade (3) Non-grade (4) Mastery testing
41-42 EX53 Activities: (1) Incidental (2) Adjunct (3) Integrated
43-44 EX54 Text: (1) Text only (2) Text and manipulatives (3) Manipulatives only

Control Group

Characteristics:
Pre - instructional Strategies:
45-46 CT01 Advance Organizers: (1) Used (2) Integrative (3) Expository (4) Subsumption (5) Correlative (6) Comparative (7) Expository (Abstract) (8) Expository (Concrete)
47-50 CT02 Length (1) ________Words (2) ________ Minutes
51-52 CT03 Style: (1) Written (2) Written & Lab (3) Verbal (4) Discussion
53-54 CT04 Behavioral Objectives: (1) Used
55-56 CT05 Set Induction: (1) Used

Inquiry Orientation:
57-58 CT06 Inductive vs. Deductive: (1) Inductive (Discovery) (2) Deductive (Expository)
59-60 CT07 Guidance: (1) Structured (2) Free exploration (3) Guided exploration
Manipulative Level:
61-62 CT08 Level of Access: (1) Remote demonstration (2) Individual manipulation
63-64 CT09 Extent of Access: (1) Periodic (2) Frequent
65-66 CT10 Type of Use: (1) Picture study (2) Object manipulation (3) Both
67-68 CT11 Levels of Inquiry (see Shulman & Tamir, 1973): (1) None (2) Low (3) Medium (4) High

Characteristics of Learning Tasks:
69-70 CT12 Kinetic Structure (see Anderson, 1969): (1) Low structure (2) High structure (3) Intermediate structure
Card 5 1-5 CT13 Commonality Coefficient (B_1) (3 digits to right of decimal)
6-7 CT14 Mathemagenic Behaviors (see Rothkopf, 1970): (1) Used (2) Translation (3) Segmentation (4) Processing
8-9 CT15 Types of Learning (see Gagne, 1970): (1) Signal (2) Stimulus-Response (3) Chaining (4) Verbal association (5) Multiple discrimination (6) Concept learning (7) Rule learning (8) Problem solving
10-11 CT16 Levels of Activities (see Bloom, 1956): (1) Knowledge (2) Concept (3) Application (4) Analysis (5) Synthesis (6) Evaluation (7) Application - Evaluation
12-13 CT17 Conditions of Learning (see Gagne, 1977): (1) Motor skills (2) Attitude (3) Verbal information (4) Intellectual skills (5) Cognitive strategies (6) Intellectual skills & Cognitive strategies
14-15 CT18 Kinds of Activities (1) Recall (2) Distinctions (3) Develop (4) Assess

16-17	CT19	Learning Structure Condition: (1) Compatible (2) Incompatible

Scientific Thinking and Reasoning Strategy Orientation:

18-19	CT20	Cognitive level of emphasis (see Piaget, 1936): (1) Sensory Motor (2) Pre-operational (3) Concrete operational (4) Formal operational
20-21	CT21	Reasoning strategies: (1) Hypothetico-Deductive (2) Theoretical (3) Combinatorial (4) Probabilistic (5) Proportional (6) Proportional & Combinatorial
22-23	CT22	Cognitive level of emphasis (see Klausmeier, 1979): (1) Concrete level (2) Identity level (3) Classificatory level (4) Formal level
24-25	CT23	Process-orientation: (1) Observation (10) Investigating and Manipulating: (11) Controlling variables (12) Predicting (13) Formulating hypotheses (14) Deisgning experiments (15) Experimenting (20) Organizing and Quantifying: (21) Measuring (22) Classifying (23) Using numbers (24) Collecting and organizing data (30) Generalizing: (31) Inferring (32) Interpreting data (33) Explanation (34) Formulating models

Structure of Content: (see Haggis and Adey, 1979):

26-27	CT24	Organization of content: (1) Topic (2) Process (3) Concept (4) Environment (5) Historical (6) Psychological (7) Random
28-29	CT25	Scope of Content: (1) Disciplinary (2) Integrated (3) Multi-Disciplinary (4) Interdisciplinary
30-31	CT26	Disciplines: L) Chemistry and Physics (2) Biology, Chemistry, and Physics (3) Science and Industrial Arts (4) Physical Geology and Archeology (5) Biology and Art (6) Science and Math
32-33	CT27	Intensity of Integration: (1) Coordinated (2) Combined (3) Amalgamated

Question Characteristics:

34-35	CT28	Level (see Bloom, 1956): (1) Knowledge (2) Concept (3) Application (4) Analysis (5) Synthesis (6) Evaluation (7) Application-Evaluation
36-37	CT29	Type: (1) Adjunct (2) Relevant (3) Incidental
38-39	CT30	Degree of Generality: (1) Items (2) Catagories (3) Systematic Patterns

Instructional Sequencing:

40-41	CT31	Type: (1) Progressive differentiation (2) Developmental level of cognitive functioning (3) Hierarchical (4) Random (5) Learning cycle (i.e. SCIS)
42-43	CT32	Sequencing Unit: (1) Single lesson (2) Instructional unit (3) Instructional Term (4) Instructional Program

Characteristics of Content:

44-45	CT33	Content-orientation (see Klopfer, 1971): (1) General science (10) Biological science: (11) Microbiology (12) Genetics (13) Evolution (14) Botany (15) Zoology (16) Physiology (17) Ecological (24) Biological Names

(25) Chemistry:(26) Atomic and Molecular Structure (27) Chemical Bonding (28) Mole Concept (29)Chemical reactions (30) Kinetic Theory (31) Energy Relationships and Equilibrium in Chemical Systems (32) Electrochemistry (33) Organic Chemistry (34) Chemistry of Life Processes (35) Nuclear Chemistry

(40)Physics: (41) Electricity and Magnetism (42) Heat (43) Energy (44) Light (45) Properties and Structure of Matter (46) Sound and Wave Phenomena (47) Mechanic and Motion (48) Heat and Optics

(55) Earth Science (56) Astronomy (57) Physical Geology (58) Oceanography (59) Meteorology (60) Historical Geology

(65) Biochemistry

46-47 CT34 Concept orientation (see Fuse, 1975): (1) Cause-effect (2) Change (3) Cycle (4) Energy (5) Matter (6) Interaction (7) Model (8) Organism (9) Population (1) System (11) Theory

48-49 CT35 Affective orientation: (1) Used

50-51 CT36 (see Bloom, 1964): (1) Attending (2) Responding (3) Valuing (4) Organization (5) Value complex

52-53 CT37 Values orientation (see Fuse, 1975): (1) Longing to know (2) Questioning (3) Search for data (4) Demand for verification (5) Logic (6) Consideration of premises (7) Consideration of Solutions

54-55 CT38 Issues and/or Application orientation: (1) Used

Representation of Content:

56-57 CT39 Relationships: (1) Used (2) Concept Maps (3) Flow Diagrams: Picture Word (4) Flow Diagram: Block Word

58-59 CT40 Pictorial: (1) Photograph (2) Perspective Diagram (3) Outline Drawing

60-61 CT41 Exemplification: (1) Analogy (2) Metaphor

Prior Knowledge Assessment:

62-63 CT42 (1) Used (2) Prerequisite concepts (3) Prerequisite concepts: Mathematics

64-65 CT43 Purpose: (1) Covariance (2) Instructional (3) Independent Variable

Postinstructional Strategies:

66-67 CT44 Post Organizer: (1) Used

Features:

68-69 CT45 Teacher interaction: (1) Direct (2) Indirect

Instructional Technique:

70-71 CT46 Management: (1) Diagnostic testing and prescription (2) Mastery learning approach (3) Competency-based

Card 6 1-2 CT47 Organization: (1) Individualized instruction (2) Computer managed or assisted instruction (3) Audio-tutorial (4)Programmed

Mode of Communicating Knowledge:
3-4 CT48 (1) Audio-visual (2) Audio (3) Written
5-6 CT49 (1) Lecture (2) Discussion (3) Both
7-8 CT50 (1) Demonstration (2) Laboratory (3) Field Trip (4) Demonstration and Laboratory (5) Laboratory and Field Trip

Evaluation Techniques:
9-10 CT51 Testing Format: (1) Objective (2) Subjective (3) Both
11-12 CT52 Grading: (1) Pass/fail (2) Letter grade (3) Non-grade (4) Mastery testing

13-14 CT53 Activities: (1) Incidental (2) Adjunct (3) Integrated
15-16 CT54 Text: (1) Text only (2) Text and manipulatives (3) Manipulatives only

OUTCOME CHARACTERISTICS

Intent of Assessment:
17-18 OC01 Aquisition (Novelty of Content): (1) Identical (2) Similar
19-20 OC02 Transfer (Novelty of Context): (1) Related (2) New (3) Vertical (4) Lateral
21-22 OC03 Retention (wks.)

Domain orientation:
23-24 OC04: (1) Cognitive
(2) Knowledge and/or comprehension (3) Application
(4) Cognitive mixed - general achievement (5) Process skills
(6) Critical thinking and problem solving (7) Creativity
(8) Decision-making (9) Logical thinking - Piagetian
(10) Spatial relationship (11) Formal understanding

(20)Affective
(21)Affective-subject
(22)Affective-science
(23)Affective-procedure/method (24) Values (25) Interest
(26)Nature of scientific knowledge (27) Affective- milieu

(40) Psychomotor/Behavioral (41) Methods of science
(42) On-task behavior/learner activity (43) Task performance

25-26 OC05 Congruence of Measurement (Experimental - T1): (1)Yes (2)No
27-28 OC06 Congruence of Measurement (Control - T2): (1)Yes (2) No
29-30 OC07 Type of Measurement: (1) National published (2) Ad hoc unpublished (3) Teacher made classroom evaluation instrument
31-32 OC08 Method of Measurement: (1) Multiple choice (2) Questionnaire (3) Observation (4) Structured Interview (5) Open-ended (6) Ordinal Scale (7) Multiple choice and essay (8) Multiple choice and short answer
33-34 OC09 Content-orientation: (1) Reading (10) Mathematics (20) Social science (30) Science (40) Biological sciences (41) Microbiology (42) Genetics (43) Evolution (44) Botany (46) Physiology (47) Ecological (49) Biological Terms (50) Chemistry (51) Atomic and Molecular Structure (52) Chemical Bonding (53) Mole Concept (54) Chemical reactions (55) Kinetic Theory (56) Energy relationships and equilibrium in chemical systems (59) Nuclear Chemistry (60) Physics (61) Electricity and Magnetism (62) Heat (63) Energy (64) Light (65) Properties

		and structure of Matter (66) Sound and wave phenomena (67) Mechanics and Motion (68) Heat and Optics (70) Earth science (72) Physical geology (80) Biochemistry
35-36	OC10	Reactivity (i.e. fakeability - see conventions): (1) low (2) Medium (3) high
37-41	OC11	Reliability (2 digits to right of decimal)

EFFECT SIZE CALCULATION

42-43	ES01	Source of effect size data: (10) Directly from reported data or raw date (means and variances) (11) Unadjusted posttest (12) Pre-post differences (13) Covariance adjusted (20) Reported with direct estimates (21) T-value (22) ANOVA and F-value (23) Multiple comparison q (24) ANOCOVA (30) Correlational (40) Sample size and P-level (50) Backwards from variance of means with randomly assigned groups (60) Nonparametric (61) Directly from frequencies reported on ordinal scale)Probit, Chi-square) (62) Frequencies reported on nominal scale (63) Mann-Whitney U (70) Estimated from variance of gain scores (correlation guessing) (80) Guessed from independent sources (test manuals, other students using same test, conventional wisdom)
44-45	ES02	Reported significance: (1) $p < .005$ (2) $.005 < p < .01$ (3) $.01 < p < .05$ (4) $.05 < p < .10$ (5) $p > .10$
46-47	ES03	Dependent variable units: (1) grade-equivalent units (2) percentile rank (3) Other
48-49	ES04	Mean difference in grade equivalent units
50-54	ES05	Study effect size (2 digits to right of decimal)

File #5 - Teacher Education

N of Cases: 177 Cards/Case: 6

Other Information: Decimals included in raw data where appropriate.

Card	Column	Variable
1	1-4	Study Code (4 digits, corresponds to Master List)
	5-8	Start of Study
	9-12	End of Study
	13-16	Publication Date
	17	Form of Publication (1) Journal (2) Book (3) MA Thesis (4) Dissertation (5) Unpublished (6) Other

DESIGN CHARACTERISTICS

Card	Column	Variable
	18	Type of Study (1) Correlational (2) Quasi-experimental (3) Experimental (4) Other
	19	Outcomes measure on (1) Teacher/teacher trainees only (3) Students only (3) Both
	20	Assignment of teachers to treatments (1) Random (2) Matched (3) Self-selected (4) Intact groups (5) Representative sample (6) Other
	21-24	Total number of teachers assigned
	25=28	Total number of teachers analyzed
	29-31	% Mortality
	32	Teacher unit of analysis (1) Individual (2) Classroom (3) School (4) Other
	33	Teacher unit of analysis correct? (1) Yes (2) No
	34	Assignment of students to treatments (1) Random (2) Matched (3) Self-selected (4) Intact groups (5) Representative sample (6) Other
	35-38	Total number of students assigned
	39-42	Total number of students analyzed
	43	Student unit of analysis (1) Individual (2) Classroom (3) School (4) Other
	44	Student unit of analysis correct? (1) Yes (2) No
	45	Rated internal validity (1) low (2) medium (3) high
	46	Design Rating (1) low (2) medium (3) high
	47	Is data present to determine experimental and control variances? (1) Yes (2) No

TEACHER/TEACHER TRAINEE CHARACTERISTICS

Card	Column	Variable
2	5	(1) Characteristic specific for members of the individual treatment group (2) Characteristic generalized across groups (3) Characteristic as subgroups within this treatment (4) Other

6-9	Number of individuals in the sample
10-12	Age Average (years)
13-15	Age Range (years
16-18	Gender (% Female)
19	College education background (1) Elementary education major (2) Secondary education major (7-12) (3) Education major across levels (4) Major outside education (5) Other
20-21	Subject major (1) biology (2) earth science (3) chemistry (4) physics (5) science comprehensive (6) other science program (7) mix of two sciences (8) mix of more thatn two sciences*(9) mix of science and math (10) general mix (11) other than science or math *Use 8 if mix of science is not specified (i.e., science in general).
22	Subject minor (same code as above)
23	Current level of college enrollment (1) Freshman (2) Sophomore (3) Junior (4) Senior (5) Graduate (6) Mixed junior and senior (7) Other mix (8) Other
24	Degree Status: (1) less than Bachelors (2) Bachelors (3) Bachelors + 15 (4) Masters (5) Masters + 15 (6) Masters + 30 (7) Doctorate
25-26	Experience teaching (0) no teaching (1) practice teaching only (2) one year (3) two years (4) three years (5) four years (6) five years (7) six years (8) seven years (9) eight years (10) nine years (11) ten years (12) eleven years (13) twelve years (14) thirteen years (15) fourteen years and beyond
27-28	Experience teaching science (same code as above)
29-31	Experience with specific curriculum/method (average # of years)
35	Dogmatism (1) low (2) medium (3) high
36-37	Number of science courses
38-40	Semester hours of science courses
41	Grade in science courses (1) low (D-C) (2) medium (C-B) (3) high (B-A)
42-43	Number of science methods courses
44-45	Semester hours of science methods courses
46	Grade in methods courses (1) low (2) medium (3) high
47	Undergraduate grade (1) low (2) medium (3) high
48	Teacher education courses grade (1) low (2) medium (3) high
49	Grade in student teaching (1) low (2) medium (3) high

STUDENT CHARACTERISTICS*

*Used only in studies of effects of teachers' training on pupil outcomes.

Card	Column	Variable
3	1-4	Study Code
	5	(1) Characteristics specific for members of this individual treatment group (2) characteristics generalized across groups
	6-9	Number of individuals in the sample
	10-12	Age average
	13-16	Age Range
	17-19	Gender (% Female)
	20-23	Grade level (average in more than one) (one digit to right of decimal)
	24-25	N grades
	26-27	Ranges

	28-30	Average IQ (give number)
	31	IQ Homogeniety (1) Homogeneous (2) Heterogeneous
	32	Source of IQ (1) Stated (2) Inferred
	33-34	Range of IQ (number of points difference)
	35-37	Race (% non-white)
	38	Predominant minority (1) Mixican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
	39	Average SES (1) low (2) medium (3) high
	40	SES Homogeneity (1) Homogeneous (2) Heterogeneous

Card	Column	Variable
4	1-4	Study Code
	5-8	Treatment Code
	9-12	N of Treatments
	13	Sponsor (1) NSF (2) other federal (3) state (4) university based (4) other
	14	Time of treatment (1) pre-service (2) inservice (3) other
	15	Site of treatment (1) field based, site of employment
	16	Extent of treatment (1) multi-grade or level e.g. course, workshop (3) training technique (4) other
	17	Treatment geared to grade level (1) pre-school (2) elementary (3) middle school (4) junior high school (5) high school (6) general (7) other (8) secondary
	18-19	Context 1 1:
	20-21	Context 1 2:

(1) competency based program
(2) field based program
(3) self directed study program
(4) computer assisted instruction program
(5) ongoing institute
(6) summer institute
(7) workshop
(8) methods course
(9) university science course
(10) university science course design for teachers
(11) minicourse
(12) practice teaching
(13) education course (not methods)
(14) biology classroom
(15) chemistry classroom
(16) physical science classroom
(17) physics classroom
(18) earth science classroom
(19) general science classroom
(20) other science classrooms
(21) elementary classrooms
(22) microteaching peers
(23) microteaching students
(24) behavior coding training or exposure
(25) other

	22-23	Treatment Type 101:
	24-25	Treatment Type 102:

Organization:
(1) competency based program
(2) field based program
(3) ongoing institute
(4) summer institute
(5) workshop
(6) methods course
(7) science course
(8) science course designed for teachers
(9) minicourse
(10) units of study
(11)

26-27 Treatment Type 103:
- Strategy:
  - (12) general
  - (13) traditional
  - (14) inquiry
  - (15) discovery
  - (16)

28-29 Treatment Type 104:
- Mode:
  - (17) verbal
  - (18) mixed
  - (19) concrete
  - (20)

30-31 Treatment Type 105:
- Interaction:
  - (21) direct
  - (22) mixed
  - (23) indirect
  - (24)

32-33 Treatment Type 106:
- Source of structure:
  - (25) student self direct
  - (26) student interacting with materials and/or teacher
  - (27) teacher
  - (28) criterion referenced

34-35 Treatment Type 107:
- Locus of Control:
  - (29) student self-direct
  - (30) student and teacher working together
  - (31) teacher directed
  - (32) Mix, part student, part teacher

36-37 Treatment Type 108:
38-39 Treatment Type 109:
- Technique:
  - (33) IA feedback
  - (34) Instructional strategy feedback
  - (35) wait-time analysis
  - (36) questioning analysis
  - (37) micro-teaching peers
  - (38) micro-teaching students
  - (39) modeling strategy
  - (40) behavior coding training (e.g. IA) or strategy analysis
  - (56) interview training
  - (57) question construction
  - (58) persuasive communication

40-41
- Technology:
  - (41) Audio technology
  - (42) video technology
  - (43) computer technology
  - (44) programmed material (a-t)
  - (45) print material

42-43 Treatment Emphasis Content 101:
44-45 Treatment Emphasis Content 102:
46-47 Treatment Emphasis Content 103:
48-49 Treatment Emphasis Content 104:

Knowledge and Intellectual processes:
(1) science content
(2) sciences processes
(3) knowledge of teaching strategies and classification and techniques
(4) learning theory
(5) learning styles
(6) learning skills
(7) lab skills
(8) methods of science and the scientific enterprise
(9) critical thinking
(10) creativity
(11) decision making
(12) logical thinking
(13) spatial reasoning
(14) problem solving
(15) behavioral objectives
(16) teat construction
(17) planning (organizational skill)
(18) verbal behavior, general
(19) inquiry strategy
(20) concrete manipulative strategy
(21) indirect verbal behavior
(22) interpersonal behaviors (response behavior, accepting verbal, interaction, rapport) relationships
(23) wait-time
(24) questioning level
(25) classroom management
(26) discovery strategy (student center, open)
(27) attitude (general)
(28) attitude toward science
(29) attitude toward science teaching
(30) attitude toward treatment
(31) dogmatism (toward open)
(32) self-concept
(33) values
(34) philosophy of teaching (perceived role expectation)
(35) characteristics (toward student centered)
(36) implementation
(37)
(39) ESS
(40) SCIS
(41) SAPA
(42) History of science
(43) DISCUS
(44) AAAS
(45) BSCS

(50) Group process skills
(51) questions- process directed
(52) reactions to classroom situations
(53) leadership or change - agent strategies
(54) attitude toward treatment emphasis
(55) knowledge of question categories

50-52	Blank
53-55	Treatment duration (days)
56-59	Treatment duration contact (hours)
60	Fidelity to treatment (1) yes (2) no
61	Treatment contact type (1) continuous (2) intermittent (3) other
65-66	

Card	Column	Variable
5	1-4	Study Code
	5-8	Outcome Characteristics Title of Measure Used:______________________________
	9	Measure on (1) teachers (2) students (3) on students about teachers
	10-13	N of outcome
	14-15	Criteria: Use same categories as treatments emphasis
	16	Measured type: (1) Published - national standardized (2) ad-hoc for that study (3) departmental or local standard (4) classroom developed (5) other
	17	Measurement intent (1) right-wrong (2) survey, or attitude
	18	Measurement method (1) multiple choice (2) semantic differential (3) Likert (4) questionnaire (5) observation (6) interview (7) Q-sort (8) other
	19-20	Test reliability (2 digits to right of decimal)
	21	Reliability measure (1) test-retest (2) parallel forms (3) split-half (4) internal consistency
	22	Validity established (1) yes (2) no
	23	Time of measurement (1) before treatment (2) after treatment (3) pre-post (4) delayed (5) other
	24	If pre-post (1) test, retest identical (2) test, retest-parallel (3) other
	25	Reactivity (1) high (2) medium (3) low
	26	If pre-post, is a ceiling effect apparent? (1) Yes (2) No
	27-28	Inter observer reliability, inter-scorer (2 digits to right of decimal)
	29	Formula for test reliability calculation (1) KR-20 (2) Spearman Brown (3) Cronback Al (4) Hoyt's (5) ANOVA (6) Pearson product (7) KR-21 (8)
	30	Formula for inter-observer reliability (1) Scott's (2) Ebel's intraclass (3) ANOVA (4) Pearson's r (5) Hoyt
	65-66	

EFFECT SIZE

Card	Column	Variable
6	1-4	Study Code
	5-8	Treatment Comparison Code
	9-12	Outcome Code

13	Calculation of effect size (1) directly from reported data or raw data (means and variances) (2) reported with direct estimates (ANOVA, t, F) (3) directly from frequencies reported on ordinal scale (Probit, X^2) (4) backwards from variance of means with randomly assigned groups (5) nonparametrics (other than #3) (6) guessed from independent sources (test manuals, other students using the same test, conventional wisdom) (7) estimated from variance of gain scores (correlation estimating) (8) probability levels (9) pre-test data used as a control group
14-15	Number of instruments pooled to calculate effect size
22	Source of means (1) unadjusted post-test (2) covariance (3) residual gains (4) pre-post differences (5) other
23	Significance (as reported) (1) p .005 (2) p .01 (3) p .05 (4) p .10 (5) p .10
24-28	Effect Size (2 digits to right of decimal, decimal included in raw data)
65-66	

File #6 - Teacher Characteristics

N of Cases: 179　　　　Cards/Case: 7

Other Information: Decimal points are not included in raw data. Users must allow for them in their own input formal instructions. In this file, several correlations (effects) may be coded for a single case; however, they must pertain to the same outcome variable. Thus, correlations with different outcomes from the same study are considered as separate cases.

Card	Column	Variable
1	1-2	Reader Code
	3-6	Study Code
	7-10	Criterion Code (e.g., 0102 indicates first of two criteria from same study)
	11-12	Date of Study Report (last 2 digits of year)
	13	Form of Study (1) Journal (2) Book (3) Masters Thesis (4) Dissertation (5) Unpublished
		STUDENT CHARACTERISTICS
	14-18	Sample size (total N)
	19-21	Average IQ
	22	IQ Homogeneity (1) Homogeneous (2) Heterogeneous
	23	Source of IQ (1) Stated (2) Inferred
	24	Range of IQ (Number of points difference)
	26	Grade level (1) primary K-3 (2) Intermediate 4-6 (3) Jr. High 7-9 (4) Sr. High 10-12 (5) 1-6 (6) 7-12 (7) 9-12 (8) 1-12 (9) > 12
	27	Elementary science program (1) SCIS (2) SAPA (3) ESS (4) Textbook (5) Other
	28	H.S. science program (0) mixture science and non-science (1) general science (2) life science (3) physical science (4) biology (5) earth science (6) chemistry (7) physics (8) biology, chemistry, physics.
	29-30	Number of high school science courses taken
	31-32	Experience in program (# of months)
	33-35	Gender (% female)
	36	Predominant minority (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other
	37	Average SES (1) low (2) medium (3) high

38	Special Grouping (1) not grouped (2) low track (3) medium (4) high
39	Type of school (1) open (2) traditional Location______________________________
40	Type of community (1) urban (2) inner city (3) urban fringe (4) rural
41	Size of community (1) $< 10{,}000$ (2) $10{,}000 < 50{,}000$ (3) $50{,}000 < 100{,}000$ (4) $100{,}000 < 500{,}000$ (5) $500{,}000 <$ 1 million (6) $>$ 1 million
42-44	Average Class Size

TEACHER CHARACTERISTICS

45-49	Sample size (total N of teachers)
50-51	Mean age to nearest year
52-53	# of education courses taken (3 cr./course)
54-55	# of science courses taken (4 cr./ course)
56-57	# of biology courses taken
58-59	# of chemistry courses taken
60-61	# of physics courses taken
62-63	Undergraduate GPA (one digit to right of decimal)
64-65	Grade in student teaching experience (one digit to right of decimal)
66-67	Experience teaching biology (average # of years)
68-69	Experience teaching chemistry (average # of years)
70-71	Experience teaching physics (average # of years)
72-73	Experience teaching (average # of years)
74-75	Experience teaching science (average # of years)
76	Teaching specialization (0) general elementary (1) elementary science (2) life science (4) physical science (5) biology (6) earth science (7) chemistry (8) physics (9) other
77	Educational background (1) Bachelors (2) 75% Bachelors 25% Masters (3) 50% Bachelors 50% Masters (4) Masters (5) 75% Masters 25% PhD (6) 50% Masters 50% PhD (7) Doctorate (8) 25% Bachelors 75% Masters (9) 25% Masters 75% PhD

78	Subject Matter Knowledge (by standardized tests) (1) low (2) medium (3) high
79	List test: (1) NTE (2)________
80	"1" indicating 1st card of case

Card	Column	Variable	
2	1-3	Academic Institute (% teachers with training)	
	4-6	Gender (% female)	
	7-9	Race (%non-white)	
	10	Predominant Minority (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other	
	11-13	% Predominant Minority	
	14	Average SES (1) low (2) medium (3) high	
	15	Exhibitionism (1) low (2) medium (3) high	
	16	Autonomy (1) low (2) medium (3) high	
	17	Hererosexuality (1) low (2) medium (3) high	
	18	Enthusiasm (1) low (2) medium (3) high	
	19	Self Concept (1) low (2) medium (3) high	
	20	Self-actualization	(1) low (2) medium (3) high
	21	Vanity	
	22	Reflective	
	23	Physical self	
	24	Personal self	
		Intellectual Independence	
	25	Achievement	(1) low (2) medium (3) high
	26	Dominance	
	27	Self-sufficient	
	28	Adventurous	
	29	Confident	
	30	Receptivity (1) low (2) medium (3) high	
	31	Deference	(1) low (2) medium (3) high
	32	Change	
	33	Objectivity	
	34	Adaptability	
	35	Realistic	
		Friendliness	
	36	Nurturance	(1) low (2) medium (3) high
	37	Affiliation	
	38	Outgoing	
	39	Scholastic Motivation (1) low (2) medium (3) high	
	40	Order	(1) low (2) medium (3) high
	41	Endurance	
	42	Conscientious	
	43	Planfulness	

44	Intellect (1) low (2) medium (3) high	
45	Intelligence	(1) low (2) medium (3) high
46	Analytic	
47	Creative	
48	Imaginative	
	Social Behavior	
49	Motility (energy)	(1) low (2) medium (3) high
50	Stability	
51	Restraint	
52	Anxiety	
	Power Relationships	
53	Aggression	(1) low (2) medium (3) high
54	Abasement	
55	Leadership	
56	Ego Achievement	
57	Forthright	
58	Conservative	
	Values	
59	Aesthetic	(1) low (2) medium (3) high
60	Social	
61	Theoretical	
62	Technological	
	Attitudes	
63	Teaching	(1) low (2) medium (3) high
64	Science	
65	Teaching Science	
66	Specific Subject	

TEACHER BEHAVIOR

67 Laboratory (1) used
68 Professional judgment (1) low (2) medium (3) high
69 Professional Judgment by (1) peers (2) supervisors (3) administrators (4) pupils (5) parents (6) student teachers (7) others

CRITERION CHARACTERISTICS

70 Content (0) combination of sciences (1) elementary science (2) general science (3) life science (4) physical science (5) biology (6) earth science (7) chemistry (8) physics (9) other than science

71-72 Type of Criterion (01) cognitive low (recall, comprehension) (02)cognitive high (application (03)cognitive mixture (general achievement) (04) cognitive preference (05) critical thinking (06) spatial reasoning (07) logical thinking (08) creativity (09) decision making (10) problem solving (11) curiosity (12) response behavior (13) process skills (14) methods of science (15) self-concept (16) affective science (17) affective course (18) affective method (19) social values (20) technological values (21) theoretical values (22) psychomotor (23) other

	73	Data (1) nominal (2) ordinal (3) ratio
	74	# Replications (1) one time (2) posttest (3) post-pre (4) weighted (5) repeated measurement
	75	Method of measurement: (1) published (national, broad, gauged...) (2) ad hoc or criterion referenced (3) classroom evaluation (4) observation (5) structured interview of assessment (6)records
	76	Reactivity (1) low (cognitive measures, one administration or long lag, not alterable) (2) medium (3) high (affective, transparent, alterable)
	77-78	Criterion for teacher behavior (01) teaching effectiveness, efficiency (02) interrelationship between students and teacher (sharing concern, understanding...) (03) similarity of cognitive patterns - (student similarity to teacher) democratic practices (04) teacher orient.(lecture, info. giving, teacher talk, directedness)(05) teacher-student orient.(info.seeking, discussion) (06)student orient.(inquiry, stud.talk, process orientation) Forms of expression: (07) verbal (08) non-verbal (09) congruent (10) contradictory (11) questioning behavior (12) low-level factual, rhetorical (13) flexible-clarifying (14) high-complex, associative, critical thinking (15) wait-time (16) discipline - classroom management (17) use of objectives, directed motivation (18) teacher aura (responsible, interesting...) (19) type of curriculum (text, inquiry...) (20)use of methods, materials (labs...) (21) content development (22) method of teaching (traditional, team...) (23) attigude toward other teaching staff (24) achievement tests of teaching behaviors, science processes (25) attitudes, expectations of specific curriculum (26) other
	79	Method of measurement: (0) Test (1) self report (2) students (3) supervisor's ratings (4) consultant's ratings (5) peers' ratings (6) observation (7) records (8) self reprot and staff ratings (9) structured interview
	80	"2" indicating second card of case

Card	Column	Variable
3	1-4	Mean of criterion (on total N) (one digit to right of decimal)
	5-8	Variance of criterion (on total N) (one digit to right of decimal)
	9-11	Reliability of criterion (two digits to right of decimal)
	12	Type of reliability (1) test-retest (2) equivalence (3) split-half (4) inter-rater (5) homogeneity

STUDY CHARACTERISTICS

	13	Metric of data (1) Pearson correlation (2) biserial correlation (3) point biserial correlation (4) partial correlation Reported statistic:
	14	Source of correlation data: (1) directly from reported data or raw date (means and variances) (2) reported with direct estimates (ANOVA, t,F) (3) directly from frequencies reported on ordinal scale (probit,x^2) (4) non-parametrics (other than #3) (5) guessed from independent sources (test manuals, other students using same test, conventional wisdom)

(6) p-values
(7) others
(8) combination

15 Reported significance: (1) $p \leq .005$ (2) $.005 < p \leq .01$ (3) $.01 < p \leq .05$ (4) $.05 < p \leq .10$ (5) $p < .10$ (6) $.01 < p \leq .10$ (7) $.005 \leq p \leq .05$ (8) $.005 \leq p \leq .10$

16 Unit of analysis (1) individual (2) class (3) teacher (4) grade level (5) school (6) district (7) state (8) extra-state region

Predictors:

General Instructions: Fill out one form for each criterion variable for which correlations with predictors or mean differences on predictors are reported. Criterion is defined as score measured in any of the categories listed in "Criterion Characteristics"

Special Instructions: For data in the form of mean differences in score for predictors such as_gender - in the space to the left of each predictor provide x, S.D., and n for each level of the predictor. This can then be converted into an r and coded at the right.

Rated reliability (1) $r < \underline{.70}$ (2) $\underline{.70} \leq r \leq \underline{.80}$ (3) $r > \underline{.80}$

Correlation of this predictor with student score. For all correlations there are two digits to the right of the decimal point.

TEACHER CHARACTERISTICS

18-20 Teacher age: correlation
21-23 # Education courses: correlation
24-26 # Science courses: correlation
27-29 # Biology courses: correlation
30-32 # Chemistry courses: correlation
33-35 # Physics courses: correlation
36-38 Academic institute: correlation
39-41 Gender: correlation
42-44 Race: correlation
Exhibitionism:
45 reliability
46-48 correlation
Autonomy:
49 reliability
50-52 correlation
Heterosexuality:
53 reliability
54-56 correlation
Enthusiasm:
57 reliability
58-60 correlation
Self-concept:
61 reliability
62-64 correlation

		Self-actualization:
	65	reliability
	66-68	correlation
		Reflective:
	69	reliability
	70-72	correlation
		Physical self:
	73	reliability
	74-76	correlation
	80	"3" indicating third card of case

Card	Column	Variable
		Moral and ethical self:
4	1	reliability
	2-4	correlation
		Personal self:
	5	reliability
	6-8	correlation
		Family self:
	9	reliability
	10-12	correlation
		Social self:
	13	reliability
	14-16	correlation
		Intellectual independence:
	17	reliability
	18-20	correlation
		Achievement:
	21	reliability
	22-24	correlation
		Dominance:
	25	reliability
	26-28	correlation
		Self-sufficient:
	29	reliability
	30-32	correlation
		Adventurous:
	33	reliability
	34-36	correlation
		Confident:
	37	reliability
	38-40	correlation
		Receptivity:
	41	reliability
	42-44	correlation
		Deference:
	45	reliability
	46-48	correlation
		Change:
	49	reliability
	50-52	correlation

		Objectivity:
	53	reliability
	54-56	correlation
		Adapatability:
	57	reliability
	58-60	correlation
		Realistic:
	61	reliability
	62-64	correlation
		Friendliness:
	65	reliability
	66-68	correlation
		Nurturance:
	69	reliability
	70-72	correlation
		Succorance:
	73	reliability
	74-76	correlation
	80	"4" indicating fourth card of case

Card	Column	Variable
		Affiliation:
5	1	reliability
	2-4	correlation
		Outgoing:
	5	reliability
	6-8	correlation
		Order:
	9	reliability
	10-12	correlation
		Endurance:
	13	reliability
	14-16	correlation
		Conscientious:
	17	reliability
	18-20	correlation
		Planfulness:
	21	reliability
	22-24	correlation
		Intellect:
	25	reliability
	26-28	correlation
		Intellectually oriented:
	29	reliability
	30-32	correlation
		Intelligence:
	33	reliability
	34-36	correlation
		Analytic ability:
	37	reliability
	38-40	correlation
		Creative ability:
	41	reliability
	42-44	correlation

		Imaginative:
	45	reliability
	46-48	correlation
		Motility:
	49	reliability
	50-52	correlation
		Stability:
	53	reliability
	54-56	correlation
		Restraint:
	57	reliability
	58-60	correlation
		Anxiety:
	61	reliability
	62-64	correlation
		Aggression:
	65	reliability
	66-68	correlation
		Abasement:
	69	reliability
	70-72	correlation
		Leadership:
	73	reliability
	74-76	correlation
	80	"5" indicating fifth card of case

ard	Column	Variable
		Ego achievement:
6	1	reliability
	2-4	correlation
		Dogmatic:
	5	reliability
	6-8	correlation
		Forthright:
	9	reliability
	10-12	correlation
		Conservative:
	13	reliability
	14-16	correlation
		Values:
		Aesthetic:
	17	reliability
	18-20	correlation
		Social:
	21	reliability
	22-24	correlation
		Religious:
	25	reliability
	26-28	correlation
		Theoretical:
	29	reliability
	30-32	correlation
		Technological:
	33	reliability
	34-36	correlation

	Economic:
37	reliability
38-40	correlation
	Political:
41	reliability
42-44	correlation
	Attitudes:
	Teaching:
45	reliability
46-48	correlation
	Science:
49	reliability
50-52	correlation
	Teaching science:
53	reliability
54-56	correlation
	Specific subject:
57	reliability
58-60	correlation
61-63	Undergraduate GPA: correlation
64-66	Student teaching grade: correlation
67-69	Experience teaching biology: correlation
70-72	Experience teaching physics: correlation
73-75	Experience teaching: correlation
76-78	Experience teaching science: correlation
80	"6" indicating sixth card of case

Card	Column	Variable
7	1-3	Teaching specialization: correlation
	4-6	Educational background: correlation
		Subject matter knowledge:
	7	reliability
	8-10	correlation
		Cognitive preference:
	11	reliability
	12-14	correlation
		Masculinity
	15	reliability
	16-18	correlation
	19-21	Use of curricula: correlation
		Cognitive pattern similarity:
	22	reliability
	23-25	correlation
		Cognitive level similarity:
	26	reliability
	27-29	correlation
	30	Statistical manipulation: (1) high (2) medium (3) low
	80	"7" indicating seventh card of case

File #7 - Student Characteristics

N of Cases: 308 Cards/Case: 7

Other Information: Decimal points are not included in raw data. Users must allow for them in their own input format instructions. In this file, several effects (or correlations) may be coded for a single case; however, they must pertain to the same outcome variable. Thus, effects involving different outcomes from the same study are reported as effects for different cases. Many cards in this file are completely blank.

BACKGROUND AND CODING INFORMATION

Card	Column	Variable
1	1-2	Reader Code
	3-6	Study Code
	7-10	Criterion Code (e.g., "0102" means that this is the first of two criteria coded from study)
	11-12	Date of Study Report (last two digits of year)
	13	Form of Study (1) Journal (2) Book (3) Master's Thesis (4) Dissertation (5) Unpublished
		STUDENT CHARACTERISTICS
	14-18	Sample Size (Total n if mean difference is metric)
	19-21	Average IQ
	22	IQ homogeneity (1) homogeneous (2) heterogeneous
	23	Source of IQ (1) stated (2) inferred
	24-25	Range of IQ (number of points difference)
	26-27	Mean age to nearest year
	28-29	Grade level (average if more than one)
	30-32	Gender (% Female)
	33	Handicapped (1) visually impaired (2) hearing impaired (3) learning disability (4) emotionally disturbed (5) multiple handicaps (6) EMR (7) other (8) combination or not specifically identified
	34-36	Race (% non-white)
	37	Predominant Minority (1) Mexican (2) Non-Mexican Hispanic (3) Oriental (4) American Indian (5) Black (6) Other

Minority Percentages
38-40 Mexican
41-43 Non-Mexican Hispanic
44-46 Oriental
47-49 American Indian
50-52 Black
53-55 Other

56 Average SES (1) low (2) medium (3) high
57 SES Homegeneity (1) homogeneous (2) heterogenous
58-60 Average class size
61 Special Grouping (1) not grouped (2) low track
(3) medium (4) high (5) mixed
62 Type of school (1) open (2) traditional (3) mixed
63 Type of community (1) urban (2) inner city (3) suburban
(4) rural (5) looked at more than one, mixed
64 Science program (1) SCIS (2) SAPA (3) ESS
(4) Textbook __________________ (5) Activity-centered
(6) Mixed (Exp. + Control) (7) Other (8) NSF-sponsored
secondary curriculum
65 Number of years in elementary science program

High School Science Background (courses taken by students)
66 General Science (1) yes (2) no
67 Life Science (1) yes (2) no
68 Physical Science (1) yes (2) no
69 Biology (1) yes (2) no
70 Earth Science (1) yes (2) no
71 Chemistry (1) yes (2) no
72 Physics (1) yes (2) no

73 Number of secondary science courses taken (blank if unknown)
74-75 Experience in program (# of months in treatment program)

STUDY CHARACTERISTICS

76-77 % Mortality
78-79 Source of correlation data
(1) Directly from reported data or raw data (means & variances)
(2) Reported with direct estimates (ANOVA, t, F)
(3) Directly from frequencies reported on ordinal scale (Probit, x^2)
(4) Backwards from variance of means with randomly assigned groups (v, etc.)
(5) Nonparametrics (other than #3)
(6) Guessed from independent sources (test manuals, other studies using same test, conventional wisdom)
(7) Estimated from variance of gain scores (correlation guessing)
(8) p values - (find t value of p and work backward)
(9) Reported with indirect estimates (ANCOVA)

(10) Pearson correlation
(11) Biserial correlation
(12) Point biserial
(13) Spearman's RHO
(14) Calculated based on gains
(15) Other
(16) More than one
(17) From pooled Δ's to t's and worked backwards

80 Unit of analysis (1) individual (2) grade level (3) school (4) district (5) state (6) extra-state regions

CODING INFORMATION

Card	Column	Variable
2	1	Card Number (always "2")
	2-5	Study code
	6-9	Criterion code

STUDY CHARACTERISTICS

10 Rated quality of study (1) low (2) medium (3) high
11 Comparability of groups (1) low (2) high
12 Assignment of Ss to treatment (1) random (2) matched (3) covariance adjustment of intact groups (4) intact groups

CRITERION CHARACTERISTICS

Title of criterion measure used:________________________________

13-14 Content
(1) Elementary science
(2) General science
(3) Biology
(4) Life science
(5) Earth science
(6) Physical science
(7) Chemistry
(8) Physics
(9) Other science
(10) Combination of preceding
(11) Non-science

15-16 Type of criterion
(1) cognitive level (e.g., Piaget)
(2) knowledge
(3) higher level skills - analysis, synthesis, and evaluation
(4) understanding, comprehension
(5) critical thinking
(6) creativity
(7) decision making

(8) science achievement (knowledge)
(9) affective level
(10) attitudes toward science class or instruction
(11) attitude toward method or system
(12) psychomotor/manipulative skills
(13) attitude toward science and the scientist
(14) questioning skills
(15) problem solving skills
(16) change in achievement
(17) science interest
(18) science background
(19) process skills
(20) science grades
(21) self concept
(22) application

17 Method of measurement
(1) published national, broad gauged, standardized
(2) ad hoc written tests
(3) classroom evaluation (not including 1 and 2)
(4) observation (passive, unstructured)
(5) structured interview or assessment

18-21 Mean of criterion (on total N)
22-25 Variance of criterion (on total N)
26 Reliability of criterion (1) $r \leq .4$ (2) $.4 < r < .7$ (3) $r \geq .7$

PREDICTORS

Rated reliability (1) $r \leq .4$ (2) $.4 < r < .7$ (3) $r \geq .7$
Correlation of this predictor with criterion (-.26 coded -26) (+.38 coded 38)
NOTE: All correlations and deltas contain two digits to the right of the decimal. Signs are included in the raw data, but decimal points are not.

27 Sex: Reliability (ignore)
28-30 Correlation between sex and criterion

SEX EFFECT SIZE

31-34 $\Delta_m = \frac{\bar{X}_m - \bar{X}_f}{s_m}$ (sign in first space-numbers follow)

35-38 $\Delta_f = \frac{\bar{X}_m - \bar{X}_f}{s_f}$

39-42 Δ using pooled variance (m & f)
43-44 Source of effect size data
(1) directly from reported data or raw data (means and variances)
(2) reported with direct estimates (ANOVA, t, F)
(3) directly from frequencies reported on ordinal scale (Probit, x^2)

(4) backwards from variance of means with randomly assigned groups (v, etc.)
(5) nonparametrics (other than #3)
(6) guessed from independent sources (test manuals, other studies using same test, conventional wisdom)
(7) estimated from variance of gain scores (correlation guessing)
(8) p values - (find t value of p and work backward)
(9) reported with indirect estimates (ANCOVA)
(10) Pearson correlation
(11) biserial correlation
(12) point biserial
(13) Spearman's RHO
(14) calculated based on gains
(15) other
(16) more than one
(17) from calculated r values to t's and worked backwards

45-47	SAT scores (verbal) correlation
48-50	SAT scores (math) correlation
51	Age (grade level): Reliability
52-54	Correlation
55	Anxiety: Reliability*
56-58	Correlation
59	Arithmetic scores: Reliability*
60-62	Correlation
63	Attitude toward science: Reliability*
64-66	Correlation
67	Attitude toward school: Reliability*
68-70	Correlation
71	Cognitive level: Reliability*
72-74	Correlation
75	Environmental attitude: Reliability*
76-78	Correlation

CODING INFORMATION

Card	Column	Variable
3	1	Card Number (always "3")
	2-5	Study code
	6-9	Criterion code

SEX EFFECT SIZE

10	Environmental knowledge: Reliability*
11-13	Correlation
14	Handicaps: Reliability*
15-17	Correlation
18	Homework: Reliability
19-21	Correlation
22	Interest: Reliability*
23-25	Correlation
26	Internality: Reliability*
27-29	Correlation

30	IQ: Reliability*
31-33	Correlation
34	IQ (verbal): Reliability*
35-37	Correlation
38	IQ (nonverbal): Reliability*
39-41	Correlation
42	Language arts: Reliability*
43-45	Correlation
46	Math ability: Reliability*
47-49	Correlation
50	Motivation: Reliability*
51-53	Correlation
54	Number of science courses taken: Reliability
55-57	Correlation
58	Reading ability: Reliability*
59-61	Correlation
62	Achievement (grades): Reliability
63-65	Correlation
66	Achievement (tests): Reliability
67-69	Correlation
70	Science background: Reliability
71-73	Correlation
74	Self-concept: Reliability*
75-77	Correlation
78-79	Content of achievement predictors
	(1) Elementary science
	(2) General science
	(3) Biology
	(4) Life science
	(5) Earth science
	(6) Physical science
	(7) Chemistry
	(8) Physics
	(9) Other science
	(10) Combination of preceding sciences
	(11) Total GPA
	(12) Math (grades)
	(13) Language arts
	(14) Creative arts
	(15) Social studies
	(16) Academic performance on some test

(17) Knowledge
(18) Comprehension
(19) Application
(20) Higher Level Skills

CODING INFORMATION

Card	Column	Variable
4	1	Card Number (always "4")
	2-5	Study code
	6-9	Criterion code

SEX EFFECT SIZE

10	SES: Reliability
11-13	Correlation
14	Spatial ability: Reliability*
15-17	Correlation
18	Study skills: Reliability
19-21	Correlation
22	Race (white/black): Reliability
23-25	Correlation

RACE EFFECT SIZE

Deltas computed for various pairings of races: white(W), black(b), Mexican(M), Non-Mexican Hispanic(N), Oriental(O), American Indian(A), other(OT)

26-29	$\Delta = \frac{\bar{X}_W - \bar{X}_B}{s_W}$
30-33	$\Delta = \frac{\bar{X}_W - \bar{X}_B}{s_B}$
34-37	$\Delta = \frac{\bar{X}_W - \bar{X}_M}{s_W}$
38-41	$\Delta = \frac{\bar{X}_W - \bar{X}_M}{s_M}$
42-45	$\Delta = \frac{\bar{X}_W - \bar{X}_N}{s_W}$
46-49	$\Delta = \frac{\bar{X}_W - \bar{X}_N}{s_N}$

50-53 $\Delta = \frac{\bar{X}_W - \bar{X}_O}{s_W}$

54-57 $\Delta = \frac{\bar{X}_W - \bar{X}_O}{s_O}$

58-61 $\Delta = \frac{\bar{X}_W - \bar{X}_A}{s_W}$

62-65 $\Delta = \frac{\bar{X}_W - \bar{X}_A}{s_A}$

66-69 $\Delta = \frac{\bar{X}_B - \bar{X}_M}{s_B}$

70-73 $\Delta = \frac{\bar{X}_B - \bar{X}_M}{s_M}$

74-77 $\Delta = \frac{\bar{X}_B - \bar{X}_N}{s_B}$

78-80 $\Delta = \frac{\bar{X}_B - \bar{X}_N}{s_N}$

CODING INFORMATION

Card	Column	Variable
5	1	Card Number (always "5")
	2-5	Study Code
	6-9	Criterion Code

RACE EFFECT SIZE

10-13 $\Delta = \frac{\bar{X}_{OT} - \bar{X}_A}{s_p}$ where s_p = pooled standard deviation estimate based on pooled variances of both races

14-17 $\Delta = \frac{\bar{X}_B - \bar{X}_O}{s_B}$

18-21 $\Delta = \frac{\bar{X}_B - \bar{X}_O}{s_O}$

22-25 $\Delta = \frac{\bar{X}_B - \bar{X}_A}{s_B}$

26-29 $\Delta = \frac{\bar{X}_B - \bar{X}_A}{s_A}$

30-33 $\Delta = \frac{\bar{X}_M - \bar{X}_N}{s_M}$

34-37 $\Delta = \frac{\bar{X}_M - \bar{X}_N}{s_N}$

38-41 $\Delta = \frac{\bar{X}_M - \bar{X}_O}{s_M}$

42-45 $\Delta = \frac{\bar{X}_M - \bar{X}_O}{s_O}$

46-49 $\Delta = \frac{\bar{X}_M - \bar{X}_A}{s_M}$

50-53 $\Delta = \frac{\bar{X}_M - \bar{X}_A}{s_A}$

54-57 $\Delta = \frac{\bar{X}_N - \bar{X}_O}{s_N}$

58-61 $\Delta = \frac{\bar{X}_N - \bar{X}_O}{s_O}$

62-65 $\Delta = \frac{\bar{X}_N - \bar{X}_A}{s_N}$

66-69 $\Delta = \frac{\bar{X}_N - \bar{X}_A}{s_A}$

70-73 $\Delta = \frac{\bar{X}_O - \bar{X}_A}{s_O}$

74-77 $\Delta = \frac{\bar{X}_O - \bar{X}_A}{s_A}$

CODING INFORMATION

Card	Column	Variable
6	1	Card Number (always "6")
	2-5	Study Code
	6-9	Criterion Code

RACE EFFECT SIZE

10-13 $\Delta = \frac{\bar{X}_W - \bar{X}_B}{s_p}$

14-16	Race (white/Mexican) correlation with criterion
17-20	$\Delta = \frac{\bar{X}_W - \bar{X}_M}{s_p}$
21-23	Race (white/Non-Mexican Hispanic) correlation with criterion
24-27	$\Delta = \frac{\bar{X}_W - \bar{X}_N}{s_p}$
28-30	Race (white/Oriental) correlation with criterion
31-34	$\Delta = \frac{\bar{X}_W - \bar{X}_O}{s_p}$
35-37	Race (white/American Indian)correlation with criterion
38-41	$\Delta = \frac{\bar{X}_W - \bar{X}_A}{s_p}$
42-44	Race (black/Mexican) correlation with criterion
45-48	$\Delta = \frac{\bar{X}_B - \bar{X}_M}{s_p}$
49-51	Race (black/Non-Mexican Hispanic) correlation with criterion
52-55	$\Delta = \frac{\bar{X}_B - \bar{X}_N}{s_p}$
56-58	Race (black/Oriental) correlation with criterion
59-62	$\Delta = \frac{\bar{X}_B - \bar{X}_O}{s_p}$
63-65	Race (black/American Indian) correlation with criterion
66-69	$\Delta = \frac{\bar{X}_B - \bar{X}_A}{s_p}$
70-72	Race (Mexican/Non-Mexican Hispanic) correlation with criterion
73-76	$\Delta = \frac{\bar{X}_M - \bar{X}_N}{s_p}$
77-79	Race (Mexican/Oriental) correlation with criterion

CODING INFORMATION

Card	Column	Variable
7	1	Card Number (always "7")
	2-5	Study Code
	6-9	Criterion Code
		RACE EFFECT SIZE
	10-13	$\triangle = \frac{\bar{X}_M - \bar{X}_O}{s_p}$
	14-16	Race (Mexican/American Indian) correlation with criterion
	17-20	$\triangle = \frac{\bar{X}_M - \bar{X}_A}{s_p}$
	21-23	Race (Non-Mexican Hispanic/Oriental) correlation with criterion
	24-27	$\triangle = \frac{\bar{X}_N - \bar{X}_O}{s_p}$
	28-30	Race (Non-Mexican Hispanic/American Indian) correlation with criterion
	31-34	$\triangle = \frac{\bar{X}_N - \bar{X}_A}{s_p}$
	35-37	Race (Oriental/American Indian) correlation with criterion
	38-41	$\triangle = \frac{\bar{X}_O - \bar{X}_A}{s_p}$
	42-44	Race (other/white) correlation with criterion
	45-48	$\triangle = \frac{\bar{X}_{OT} - \bar{X}_W}{s_p}$
	49-51	Race (other/black) correlation with criterion
	52-55	$\triangle = \frac{\bar{X}_{OT} - \bar{X}_B}{s_p}$
	56-58	Race (other/Mexican) correlation with criterion
	59-62	$\triangle = \frac{\bar{X}_{OT} - \bar{X}_M}{s_p}$

63-65	Race (other/Non-Mexican Hispanic) correlation with criterion
66-69	$\Delta = \frac{\bar{X}_{OT} - \bar{X}_N}{s_p}$
70-72	Race (other/Oriental) correlation with criterion
73-76	$\Delta = \frac{\bar{X}_{OT} - \bar{X}_O}{s_p}$
77-79	Race (other/American Indian) correlation with criterion

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Availability of Data

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*Price subject to change without notice.

Publications Prepared Under NSF Grant No. SED 80-12310

Anderson, R.D., Kahl, S.R., Glass, G.V, and Smith, M.L. "Science Education: A Meta-Analysis of Major Questions," Journal of Research in Science Teaching, 20(5), May 1983.

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